OCCUPATIONAL INJURIES AND DISEASES IN ALBERTA

Oil & Gas Exploration & Development 1995 to 1999

Upstream Oil and Gas
Sub-Sector #7

Alberta
HUMAN RESOURCES
AND EMPLOYMENT

August 2000

Performance and Applied Research
Alberta Human Resources
and Employment
2nd Floor
10808-99 Avenue
Edmonton, Alberta
T5K 0G5

Phone: (780) 427 - 8531
Fax: (780) 422 - 5070
E-Mail Address:
commshare@lab.gov.ab.ca
Alberta Human Resources
and Employment website:
http://www.gov.ab.ca/hre

TABLE OF CONTENTS

1. Introduction 2

2. Sub-Sector Description 3

3. Lost-Time Claim Rates and Duration Rates 5
3.1 LTC Rates by Size of Employer: 1999 5

4. Analysis of the Lost-Time Claims 6
4.1 Nature of Injury 6
4.2 Duration of Disability 6
4.3 Type of Event/Exposure 7
4.4 Part of Body Injured 8
4.5 Source of Injury 9

5. Characteristics of the Injured Worker 10
5.1 Occupation of the Injured Worker 10
5.2 Age of injured Worker 11
5.3 Length of Time Employed 11
5.4 Gender of Injured Worker 11

6. Cost of Claims and Employer Premiums 12

7. Occupational Fatalities 13

8. OHS Investigated Occupational Fatalities: 1995-1999 14

Appendix A: Terms, Definitions, and Formulas 15

Appendix B: Upstream Oil and Gas 1999 Industry Codes 16

1. Introduction

The Mission of Alberta Human Resources and Employment

One of the missions of Alberta Human Resources and Employment is to work in partnership with Albertans to promote safe and healthy workplace, a quality working life and comprehensive safety systems. To this end, Alberta Human Resources and Employment recognises that monitoring health and safety in Alberta will help to ensure primary workplace health and safety concerns are actively managed and prioritised, and resources directed where most needed.

This report summarises the lost-time injuries and disease descriptions, characteristics of the injured worker and the risk of injury to workers in Alberta's upstream oil and gas industries for the years 1995 to 1999. Cost of the injuries and revenue in terms of total premiums paid by employers. Finally, a summary of occupational fatalities accepted by the WCB for compensation and brief descriptions of fatalities investigated by Occupation Health and Safety are also provided.

The purpose of this report is to provide government, employers, workers and health and safety officers in upstream oil and gas industries with information about the industry key health and safety issues.

Description of Upstream Oil and Gas Industries

The upstream oil and gas industries can be subdivided into the following sub-sectors.
Exploration, Oilfield Maintenance and Construction, Well Servicing with Service Rigs and Power Swivels, Drilling of Oil and Gas Wells, Oilfield Downhole and Other Services, Tar Sands, Oil and Gas exploration and Development, and Oilfield Trucking Services.

The next section gives the descriptions of the Oil and Gas Exploration and Development sub-sector.

2. Sub-Sector Description

Sub-Sector # 7: Oil/Gas Exploration/ Development- Upstream Operations

Oil &Gas Exploration & Development-upstream operations (Industry # 06300)
This industry covers all "upstream" oil field activities of employers which generate revenue from the production and sale of crude oil and/or natural gas. This includes both the small independent producer and major integrated oil and gas companies. Oil and gas companies direct/control/evaluate/supervise oil and gas exploration and development; however, they subcontract the actual field operations prior to the production stage (i.e. seismic, drilling). In effect, they are general contractors for this phase of the industry.

The operation of all upstream production/processing facilities are covered under this classification when conducted by the owner/producer.

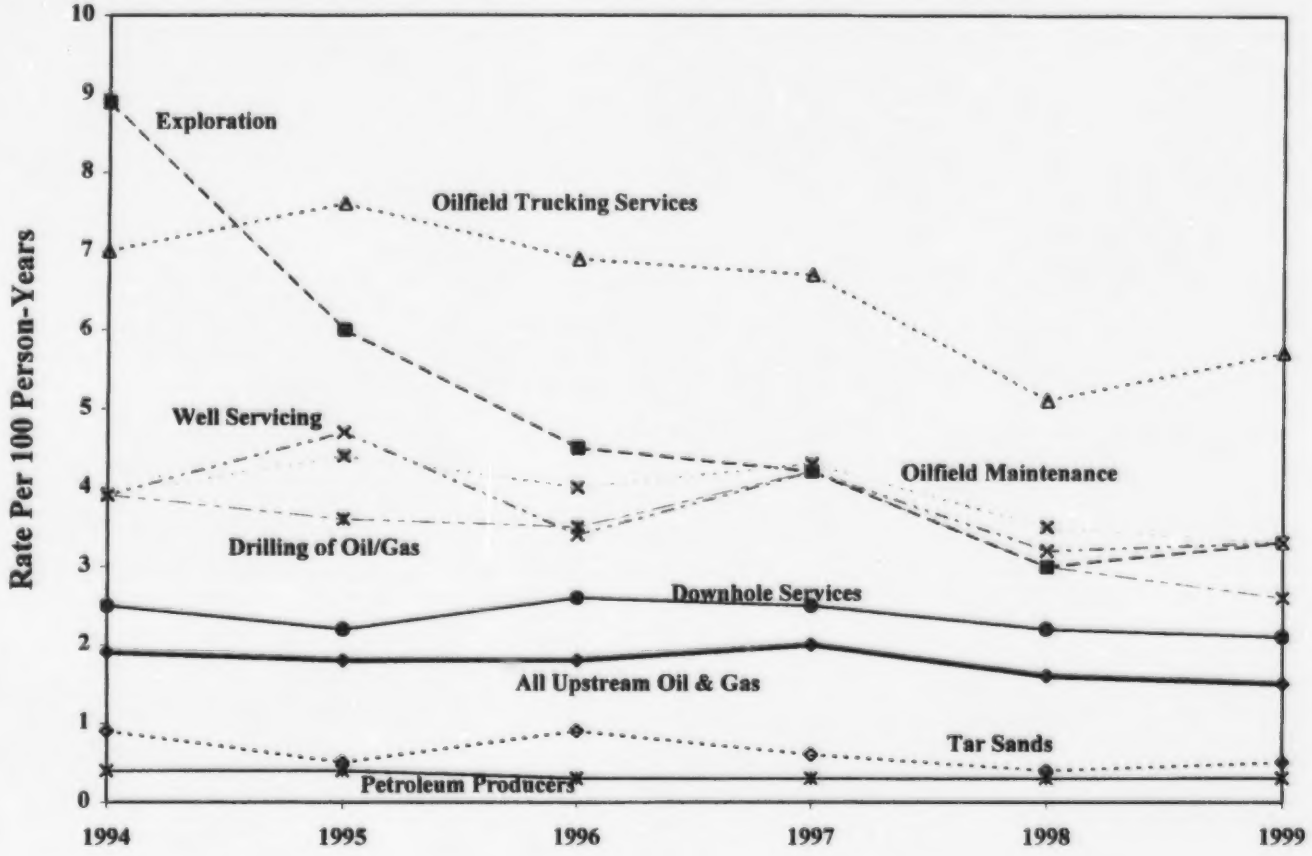
Oil or gas marketing firms, companies which are not producers but purchase product from other producers and resell, are considered part of this industry. They take title to the product and generate revenue from the sale of crude oil or natural gas.

Large oil companies may become involved in all aspect of oil exploration, processing and sale. Smaller companies may become involved only in the production and/or sale. Other companies may become involved in oil exploration purely on a speculative basis. All such employers are covered under this industry.

Upstream production facilities include:
- oil/gas well, well head equipment
- flow lines/gathering systems tied into field processing facilities
- battery sites/compressors stations
- crude oil separators and natural gas dehydrators/treaters
- natural gas/sulfur processing plants
- heavy oil projects including steam generation
- other enhanced recovery methods

Gas processing plants are normally located in the vicinity of the producing fields, and are tied directly into gas well through a network of gathering systems. This is considered to be an upstream production activity by the industry and is a common activity of major producers. Gas plants incorporate process technology, similar to refineries and petrochemical plants, for the purpose of removing impurities such as sulfur and water prior to transmission to the market.

Lost-Time Claim Rates
Upstream Oil & Gas Subsectors
Alberta: 1994-1999



3. Lost-Time Claim Rates and Duration Rates

6300-Oil & Gas Exploration & Development

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1995	1,647	$792,146	34,980	3,085	9	136	0.4
1996	1,831	$673,641	33,410	1,890	6	107	0.3
1997	2,179	$1,810,837	33,765	3,430	10	100	0.3
1998	2,274	$643,090	36,596	2,788	8	111	0.3
1999	2,418	$659,516	32,275	2,736	8	101	0.3

3.1 LTC Rates by Size of Employer: 1999

Size of Employer	# of Accounts	LTCs	Person - Years	LTC Rate
A: 0< PY <=1	1,338	5	796	0.6
B: 1 < PYs < 5	636	3	1,026	0.3
C: 5 <= PYs < 10	89	2	605	0.3
D: 10 <= PYs < 20	76	1	1,057	0.1
E: 20 <= PYs < 40	51	3	1,415	0.2
F: 40 <= PYs < 100	47	6	3,042	0.2
G: PYs >=100	58	80	24,334	0.3
H: Invalid	123	1	0	N/A
Total	2,418	101	32,276	0.3

4. Analysis of the Lost-Time Claims

4.1 Nature of Injury

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
SPRAIN, STRAIN, TEARS	44	40	37	43	42	206	37.1
FRACTURE, DISLOCATION	19	19	18	15	16	87	15.7
BURNS	16	11	10	13	12	62	11.2
OTHER TRAUMATIC INJURIES/DISEASE	4	14	11	8	9	46	8.3
SYSTEMIC DISEASES,DISORDERS	11	2	4	18	11	46	8.3
SURFACE WOUNDS, BRUISES	16	9	9	6	3	43	7.7
OPEN WOUNDS	8	3	7	5	3	26	4.7
INFECTIOUS,PARASITIC DISEASE	12	.	.	.	.	12	2.2
MULTIPLE DISEASE, DISORDERS	.	2	2	1	2	7	1.3
TUMORS,CANCER	.	.	1	.	.	1	0.2
NATURE-UNKNOWN	6	7	1	2	3	19	3.4
Total	136	107	100	111	101	555	100.0

4.2 Duration of Disability

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
A: 01 Day	11	13	12	18	9	63	11.4
B: 02 Days	10	17	11	7	11	56	10.1
C: 03 - 05 Days	34	19	14	17	14	98	17.7
D: 06 - 10 Days	21	12	12	11	13	69	12.4
E: 11 - 20 Days	20	10	12	11	9	62	11.2
F: 21 - 30 Days	8	12	5	6	7	38	6.8
G: 31 Days OR More	23	17	27	27	24	118	21.3
H: Unspecified	9	7	7	14	14	51	9.2
Total	136	107	100	111	101	555	100.0

4.3 Type of Event/Exposure

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
OVEREXERTION	21	14	19	22	16	92	16.6
BODILY REACTION	25	14	16	16	12	83	15.0
EXPOSURE TO HARMFUL SUBSTANCES	29	12	10	21	9	81	14.6
TRANSPORTATION ACCIDENTS	7	15	14	10	12	58	10.5
STRUCK BY OBJECTS	13	9	10	7	5	44	7.9
FALL ON SAME LEVEL	7	11	7	9	9	43	7.7
CAUGHT IN OBJECTS	4	6	7	5	2	24	4.3
FALL TO LOWER LEVEL	4	4	3	5	4	20	3.6
STRUCK AGAINST OBJECTS	5	4	1	3	2	15	2.7
FIRES AND EXPLOSIONS	2	4	2	2	5	15	2.7
REPETITIVE MOTIONS	.	1	2	3	8	14	2.5
OTHER FALLS	.	1	1	3	2	7	1.3
RUBBED OR ABRADED	1	.	.	1	1	3	0.5
OTHER BODILY REACTION/EXERTION	.	.	.	1	1	2	0.4
ASSAULTS/VIOLENT ACTS BY PERSONS	.	.	1	1	.	2	0.4
UNKNOWN	18	12	7	2	13	52	9.4
Total	136	107	100	111	101	555	100.0

4.4 Part of Body Injured

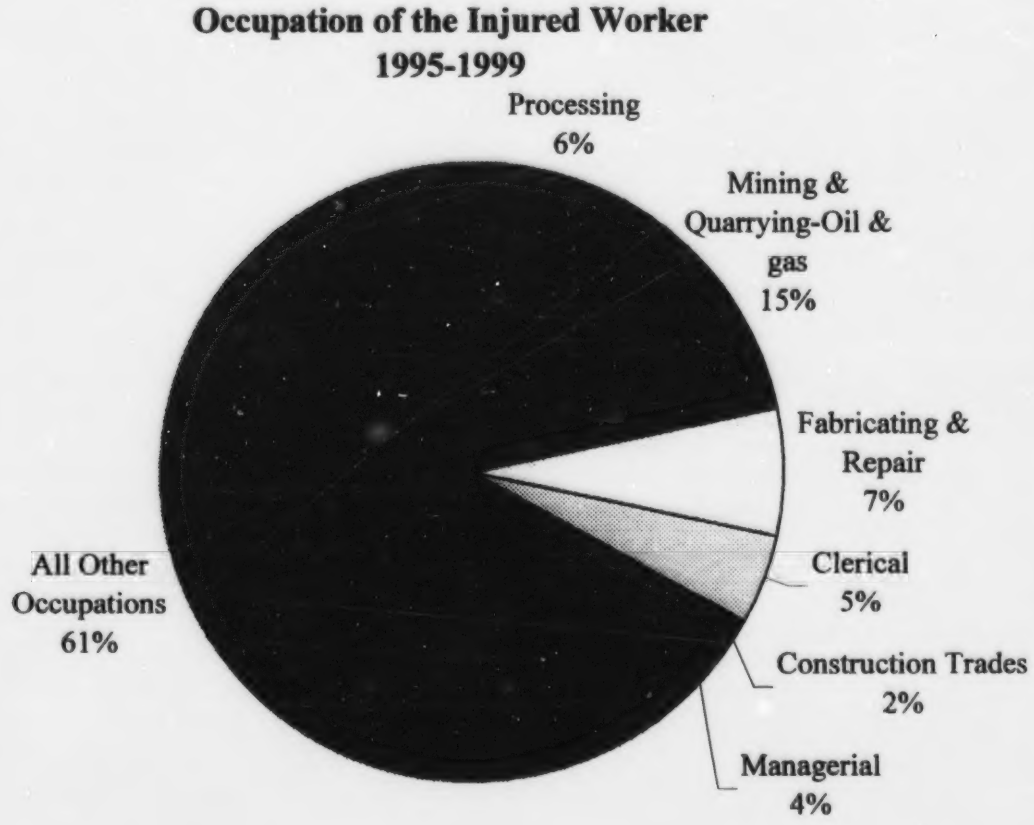
LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
OTHER HEAD	12	7	9	13	7	48	8.6
BACK	28	22	26	25	21	122	22.0
OTHER TRUNK	25	6	10	12	11	64	11.5
OTHER LOWER EXTREMITIES	1	2	1	.	.	4	0.7
ANKLE(S) & FOOT(FEET)-NOT TOES	6	16	11	13	8	54	9.7
LEG(S)	20	12	10	14	9	65	11.7
BODY SYSTEMS	3	3	1	1	1	9	1.6
OTHER UPPER EXTREMITIES	10	5	3	3	8	29	5.2
WRIST(S)/HAND(S)	15	7	5	8	9	44	7.9
FINGER(S)	4	5	5	5	2	21	3.8
MULTIPLE BODY PARTS	5	10	11	7	18	51	9.2
EYE(S)	3	4	7	6	5	25	4.5
NECK	4	7	1	3	1	16	2.9
UNKNOWN	.	1	.	1	1	3	0.5
Total	136	107	100	111	101	555	100.0

4.5 Source of Injury

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
PERSONS-INJURED WORKER	24	16	18	20	21	99	17.8
OTHER SOURCES	17	11	8	17	11	64	11.5
STRUCTURES/SURFACES	9	15	8	14	15	61	11.0
VEHICLES	8	15	15	10	12	60	10.8
PARTS AND MATERIALS	12	10	10	9	12	53	9.5
CONTAINERS	6	11	9	10	3	39	7.0
CHEMICAL/CHEMICAL PRODUCTS	4	2	5	6	2	19	3.4
MACHINERY	4	1	6	4	.	15	2.7
OTHER PLANTS/ANIMALS/MINERALS	12	2	.	.	.	14	2.5
HANDTOOLS-UNPOWERED	4	3	3	.	3	13	2.3
OTHER TOOLS/EQUIPMENTS	1	.	2	4	1	8	1.4
HANDTOOLS-POWERED	1	1	2	2	.	6	1.1
MINERALS-METALS/NONMETALLIC	1	.	1	2	.	4	0.7
FURNITURE AND FIXTURES	1	2	.	.	1	4	0.7
PERSONS-OTHER THAN INJURED WORKER	1	.	1	2	.	4	0.7
UNKNOWN	31	18	12	11	20	92	16.6
Total	136	107	100	111	101	555	100.0

5. Characteristics of the Injured Worker

5.1 Occupation of the Injured Worker



5.2 Age of injured Worker

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
A: 15 - 19 Years	1	3	3	2	1	10	1.8
B: 20 - 24 Years	6	6	8	7	10	37	6.7
C: 25 - 34 Years	42	25	22	33	27	149	26.8
D: 35 - 44 Years	57	50	44	38	38	227	40.9
E: 45 - 54 Years	20	18	18	22	19	97	17.5
F: 55+ Years	10	5	5	9	6	35	6.3
Total	136	107	100	111	101	555	100.0

5.3 Length of Time Employed

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
A: LESS THAN 1 MONTH	7	4	5	6	3	25	4.5
B: 1 MONTH TO < 6 MONTHS	10	12	8	13	16	59	10.6
C: 6 MONTHS TO < 1 YEAR	9	4	9	6	7	35	6.3
D: 1 YEAR OR MORE	91	64	56	58	51	320	57.7
E: TIME UNSPECIFIED	19	23	22	28	24	116	20.9
Total	136	107	100	111	101	555	100.0

5.4 Gender of Injured Worker

LOST-TIME CLAIMS ALBERTA: 1995 TO 1999	OCCURRENCE YEAR					Total	
	1995	1996	1997	1998	1999	Number	Percent
MALES	105	92	88	86	84	455	82.0
FEMALES	25	11	10	22	15	83	15.0
UNSPECIFIED	6	4	2	3	2	17	3.1
Total	136	107	100	111	101	555	100.0

6. Cost of Claims and Employer Premiums

Sub-Sector 7-Oil & Gas Exploration/Development

	OCCURRENCE YEAR				
	1995	**1996**	**1997**	**1998**	**1999**
TRANSACTION YEAR					
1995	$678,960				
1996	$248,879	$515,718			
1997	$31,075	$413,607	$1,064,573		
1998	$40,783	$436,156	$989,481	$511,098	
1999	$223,498	$148,065	$602,140	$472,233	$719,590
Total Cost	$1,223,195	$1,513,546	$2,656,193	$983,330	$719,590
Total Premiums	$5,036,913	$4,435,687	$5,200,591	$3,766,376	$3,583,618

The above cost of lost-time claims and premiums are for the five-year period 1995 through to 1999. The data is as at July 6, 2000.

The claim cost reflects only paid cost on lost-time claims that occurred in the five-year period. These costs are tracked by year of occurrence and the year that the costs were transacted.

The premiums are the total premiums paid by employers for each year.

7. Occupational Fatalities

An occupational fatality is the death of a worker that results from a work-related incident or exposure. Alberta Human Resources and Employment classifies occupational fatalities into three general types: motor vehicle incident, workplace incident and occupational diseases. Each is described in detail below.

Motor Vehicle Incident

Motor vehicle incidents typically involve highway vehicles operating on public roads in which the fatally injured worker was either the driver or a passenger. This category also includes fatalities involving aircraft crashes, train crashes, helicopter crashes, etc.

Workplace Incident

Fatal workplace incidents consist of cases in which the worker dies at a work site, or as a result of injuries sustained at a work site. It is this type of fatality that Alberta Human Resources and Employment may be responsible for investigating.

Occupational Diseases

Occupational disease fatalities consist mostly of recognized occupational disease, that is, disease known to be primarily or exclusively work-related (e.g. asbestosis, black lung disease). Occupational diseases are frequently diagnosed many years after the initial or crucial exposure to the toxic substance, and in such cases it is very difficult to determine when the fatal exposure occurred. Thus, the occupational disease category should not be interpreted to reflect present work site hazardous conditions or exposures.

Each year the Workers' Compensation Board (WCB) accepts some occupational fatality claims for compensation. Occupational fatality claims that were accepted in a particular year may include fatalities from prior years.

Description of Petroleum Producers Workplace Fatalities Accepted by the WCB

Year	Occupational Disease		Motor Vehicle incident		Workplace Incident		Total	
	N	%	N	%	N	%	N	%
1995	0	0.0	1	50.0	1	50.0	2	100
1996	0	0.0	1	100.0	0	0.0	1	100
1997	1	20.0	4	80.0	0	0.0	5	100
1998	1	33.3	1	33.3	1	33.3	3	100
1999	1	33.3	2	66.7	0	0.0	3	100
Total	3	21.4	9	64.3	2	14.3	14	100

8. OHS Investigated Occupational Fatalities: 1995-1999

YEAR:	1996	FILE:	0828
OCCUPATION:	Inspection, Maintenance of Measuring Equipment	AGE:	53
INDUSTRY:	Oil & Gas Exploration and Development - Upstream Operations		
EXPERIENCE:	Unknown		

DESCRIPTION: The self-employed contractor was in the process of "Gauging" (manually measuring fluid levels) Sour Crude Oil Storage Tanks through openings at the top of the tanks known as "Thief Hatches." The worker was conducting the measurement from an elevated work platform 13' 2" from the ground level. The elevated work platform had guard-rails and was connected to ground by a stairway with hand-rails. Another worker on site witnessed the self-employed contractor go up to the elevated work platform without respiratory protective equipment and/or personal monitoring equipment. The worker became exposed to hydrogen sulfide gases while taking fluid level measurements resulting in losing consciousness and falling over the guard-rail of the stair-way to the ground.

Appendix A: Terms, Definitions, and Formulas

Lost-Time Claim

A lost-time claim (LTC) is a claim for an occupational injury or disease which disables the worker beyond the day of injury. Included are claims for which wages compensation are paid, permanent disability claims, fatalities, and cases in which the injured worker is assigned light duties or other modified work.

Person-Years

Person-year estimates are calculated from wage and payroll data provided by account holders to the WCB. Alberta Labour uses these data to estimate. An average industry wage, and uses the average industry wage and employer payroll data to estimate person-years foe each employer and each industry. One person-year i.e. equivalent to one full-time worker working for one year, and can be assumed to equal 2,000 hours worked.

LTC Rate

The lost-time claim (LTC) rate is calculated by dividing the number of lost-time claims by the person-year estimate, and multiplying the result by 100. The LTC rate represent the probability or risk of disabling injury or disease to a worker during a period of one year's work. Comparisons of LTC rates between industries, or between years, can be used to indicate increases, decreases, or differences in this risk.

$$\text{LTC Rate} = \frac{\text{Number of LTCs X 100}}{\text{Estimated Person-years}}$$

Duration (Days Lost)

The duration of disability is the number of days following the injury or disease for which the worker was disabled, and unable to perform normal work duties. This information is obtained for this report from data on compensation days paid on each claim from WCB. Alberta Labour obtains these data on March 31 of the year following the claim year, and does not update the information, even though many injured workers continue to be disabled beyond this date. As a result, the duration information reported here underestimates the true impact of lost-time injury and disease.

Duration Rate

The duration rate is calculated by dividing the number of work days lost (disability days) by the person-year estimate, and multiplying by 100. The result is expressed as "days lost per 100 person-years worked" and indicates, in part, the economic impact of occupational injury and disease. Duration rates are not recommended as reliable indicators of full economic cost. In addition, readers are warned that duration rates are highly unstable when based on only a few lost-time claims; it is recommended that the duration rate not be calculated based upon fewer than 30 lost-time claims.

$$\text{Duration Rate} = \frac{\text{Disability Days X 100}}{\text{Estimated Person-Years}}$$

WCB Accepted Fatality

An occupational fatality is the death of a worker which result from a work-related incident or exposure and which has been accepted by the WCB for compensation. A fatality is counted in the year it is accepted.

NEC

Means "Not Elsewhere Classified"

UNS

Means "Unspecified"

Appendix B: Upstream Oil and Gas 1999 Industry Codes

Sub-Sector 1: **Exploration**
Industries:
09200~Seismic Geophysical/Mineral Exploration
09201~Shot Hole Drilling

Sub-Sector 2: **Oilfield Maintenance and Construction**
Industries:
06304~Oilfield Construction and/or Maintenance

Sub-Sector 3: **Well Servicing With Service Rigs**
Industries:
09903~Well servicing with Service Rigs including Power Swivels

Sub-Sector 4: **Drilling of Oil and gas Wells**
Industries:
09600~Drilling of Oil & Gas Wells

Sub-Sector 5: **Downhole & Other Oilfield Services**
Industries
06305~Field Production Operators
06306~Vacuum Removal of Waste
09900~Mud Logging
09902~Pressure Cleaning Services
09904~Rathole Drilling and Rig Anchoring
09911~Oilfield Downhole Services
09915~Well Casing Services
09921~Servicing Christmas Trees On Oil Wells
09927~Liquid Waste Treatment & Disposal

Sub-Sector 6: **Tar Sands**
Industries:
06600~Mining & Processing of Bituminous Sand
06601~Research/Development, Oil Sands and Heavy Oil Recovery

Sub-Sector 7: **Oil & Gas Exploration/Development**
Industries:
06300~Oil and Gas Exploration & Development-Upstream Operations

Sub-Sector 8: **Oilfield Trucking Services**
Industries:
50720~Oilfield Trucking Services